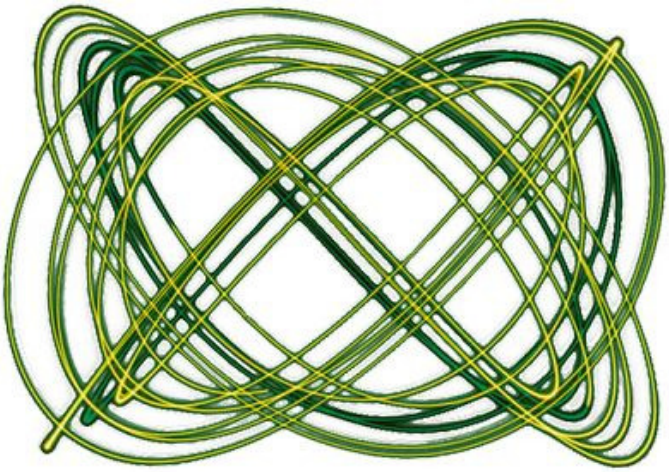

BIOGENTS

Manual

for the

BG-Sentinel

An innovative trapping system for mosquitoes & other blood-sucking insects

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(v. 4.1)

The BG-Sentinel trap

Congratulations for buying the BG-Sentinel. You have bought the latest innovation in mosquito traps that is the result of more than 10 years of thorough scientific research. The BG-Sentinel incorporates patented as well as patent pending technology and was initially developed to enable researchers all over the world to monitor the yellow fever mosquito *Aedes aegypti* and the Asian tiger mosquito *Aedes albopictus*.

During its use on different continents it became evident that the BG-Sentinel also catches other mosquitoes and blood seeking insects.

This is why the trap is now used by PCOs (Pest Control Operators) all over the world.

The BG-Sentinel does not need CO_2 to attract:

- *Aedes aegypti, Aedes albopictus, Aedes polynesiensis*
- Some *Culex* species, like *Culex quinquefasciatus* or *Culex pipiens*

With the addition of CO_2 the BG-Sentinel attracts:

- Additional mosquito species such as *Ochlerotatus* spp., *Aedes vexans, Aedes cinereus, Anopheles* spp. or *Coquillettidia* spp.
- Other blood seeking insects such as black flies (*Simuliidae*) or no-see-ums (*Ceratopogonidae*)
- More individuals of the species mentioned above (attracted without CO_2)

Trust & Competence

BG-Sentinel was successfully tested **(t)** or is used **(u)** by independent, reputable organizations all over the world, the

- WHO **(u)**
- the US armed Forces **(t)**
- Centers for Disease Control and Prevention (CDC), USA **(u)**
- London School of Hygiene and Tropical Medicine (LSHTM), UK **(t)**
- Tropical Public Health Unit Network - Cairns, Australia **(u)**
- University of Neuchatel, Switzerland **(t)**
- Federal University of Minas Gerais, Belo Horizonte, Brazil **(t)**
- University of Regensburg, Germany **(t)**

The BG-Sentinel was developed by the same work group that contributed to the development of Bayer's famous mosquito repellent, the new "Autan"

Technology & Safety

- The BG-Sentinel uses new patented and patent-pending technology.
- The BG-Sentinel is safe to handle, requiring an electric power supply of only 12 Volts and no toxic chemicals.

Flexible Use & Possible Upgrades:

- The BG-Sentinel is collapsible (diameter: 35 cm; height: 10 cm) and light (1.2 kg) making it easy to transport, carry and store.
- The BG-Sentinel can be used in-door (without CO_2) as well as out-door, just according to your needs.
- You can upgrade the BG-Sentinel with BioGents proprietary CO_2 device.
- Another upgrade is a larger catch bag for pest insects such as house flies or for mass trapping operations.

Eco-Friendliness:

- In contrast to most other traps it catches almost no beneficial insects such as honey bees and butterflies.
- The trap requires no more than 3.4 Watts per hour.

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1 User Information

For best results, the trap has to be operated permanently. If switched off, the catch bag needs to be removed and closed. Otherwise, caught mosquitoes are able to escape from the catch bag.

2 Positioning of the trap

The correct placement of the trap is an important factor that influences the potency of the trap

Outdoor use (the trap can be operated with or without CO_2):

Position the trap in a place that is sheltered from wind, heavy rainfall * and direct sunlight.

Not in wind **Not in heavy rainfall** **Not in direct sunlight**

* Rainfall will not damage the trap as long as the fan is switched on.

Good trapping positions are close to resting places of mosquitoes such as bushes, shrubs, hedges, high grass or any foliage.
Good trapping positions are also close to mosquito breeding sites such as all kinds of temporary stagnant water from small lakes to collections of rain water e.g. in rain barrels or old tyres – mosquitoes do not need a large amount of water for breeding, even an open can with some rain water can be an ideal breeding place.

The trap should not be placed too close to walls (minimum distance of approx. 20-30m)

Fig. 2: An example for ideal placement

Indoor use (do not add CO_2):

It is important that the trap is not placed in front of, or close to, backgrounds with a lot of contrast (e.g. in front of a book shelf) because the trap works with a black and white contrast as a visual stimulus and the mosquitoes could be distracted from the trap.
A good position would be for example in front of the window.

The trap is a competitor to human beings. To optimize results, leave the trap constantly running even if no humans are present in the room/house for a while.

Leave interior doors open to allow the mosquitoes to find the trap.

3 Handling of the trap

Switching off the trap:

If for some reason you want to switch off the trap, you need to remove and close the catch bag in use at the time.
This is because the funnel net only makes it difficult for the mosquitoes to escape but not impossible. Only a running fan ensures that the mosquitoes can not escape from the catch bag.

⇒ Always remove the catch bag before switching off the trap!

Removing the catch bag

When you are replacing a full catch bag by a new one (following steps 1 to 4) you should leave the fan running.

1. The black catch pipe should be placed loosely in the suction tube so that it can easily be lifted (i.e. the white gauze cover should be stretched over the trap before the catch pipe is inserted into the suction tube when assembling)

⇓

2. Lift the catch pipe approx. 10cm straight upwards always keeping the catch bag in the air suction (**Fig. 3**)

⇓

3. Carefully loosen the catch bag from the catch pipe and at the same time pull the cord of the catch bag to close it tightly (**Fig. 4**)

⇓

4. Pull out the funnel net and now you can remove the closed catch bag (**Fig. 5**)

For further use of the insects (e.g. identification/classification) it is best to put them into a freezer.

The trap does not damage the insects, but identification is complicated if the insects stay in the trap for more than 3 days or if they get wet.

Fig. 3,4 + 5: How to remove the catch bag

Note: You should attach the catch bag to the catch pipe with the seam facing towards the outside in order to avoid mosquitoes getting stuck in the seam while emptying out the catch bag.

Operating the BG-Sentinel with a large catch bag

The black catch bag, which is located above the suction fan, may not be appropriate for pest insects such as house flies or for mass trapping operations. In these cases a larger catch bag should be attached below the fan as shown in **Fig. 6** and **7**. This positioning does not allow insects to escape by crawling from the trap as long as the fan is switched on.

Fig. 6: Bag and fan

Fig. 7: Attached bag

In the assembled trap, the white catch bag lies on the bottom of the trap and the black plastic catch pipe is inserted without any attached bag.

4 Power supply and electricity

The suction fan needs a power source of 9 to 12 V DC (max. 280 mA).
An optional transformer (for US or EU use) with fitting plug connection is available.
Also extension cords, battery mounting supplies and extra plug connections are available.

The trap does not require more than 3.4 Watts per hour.

In the case of an electricity failure the funnel net hinders escape of the mosquitoes from the catch bag for a limited period of time.

Batteries

We usually recommend 12 Volt motorcycle or car batteries – these are easily rechargeable and readily available in most places.

As a rule of thumb and including a security factor which should give you a peace of mind in most real-life situations you will need a battery capacity of 10 to 11 Ah for every trap and 24 h trapping period (for a 48 h period you will need a capacity of 20 to 22 Ah and so on).

5 Lures

In principal all kind of lures can be used with the trap. Simply place the lure inside the trap in the pocket located on the outside of the suction tube.

We offer our special patented BG-Lure, which mimics the scent of human skin and releases a mixture of several compounds for up to five months. The lure uses substance which are classified as non-toxic. It is used for an added sensitivity and specificity for mosquitoes that prefer to feed on humans.

1. Open the package of the dispenser

⇓

2. Take out the dispenser

⇓

3. Place it inside the pouch located on the outside of the suction tube (**Fig. 8**)

NOTE: In tropical climates, the release rate of the components can be higher, which may lead to an increase in odour and a shorter life span of the dispenser. In these regions, it may therefore be feasible not to take the dispenser out of the package, but only to cut a hole of about 15mm into the package and then place it into the trap.

Fig. 8: BG-Lure inside the pouch of the suction tube

6 Adding CO_2

Without CO_2 the BG-Sentinel traps *Aedes aegypti, Aedes polynesiensis* and *Aedes albopictus*, the vectors of Dengue, Chikungunya, Filariasis or Yellow fever. Also some *Culex* species such as *Culex quinquefasciatus* and *Culex pipiens* can be trapped.

The addition of CO_2 enables you to catch a broader range of blood seeking species and much higher numbers of *Aedes aegypti, Aedes polynesiensis, Aedes albopictus,* and some *Culex* species.

CO_2 should be released by using BioGents CO_2-nozzle (**Fig.9**), which is customized for the BG-Sentinel trap.

Different sources of CO_2 can be used: the nozzle can be attached to a gas cylinder, any well insulated dry ice container, or another CO_2 source that fits your preference placed away from the trap.

Recommended flow rates of CO_2 gas are between 300 and 500 ml/min.

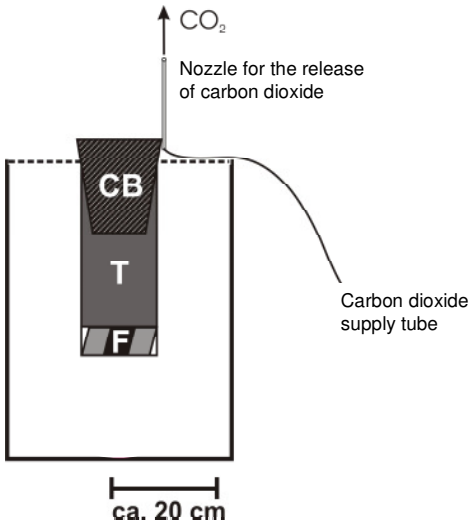


Fig. 9:
Release of CO_2 from a BG-Sentinel
CB: Catch pipe and catch bag
T: Suction tube F: Fan

Fig. 10:
Attach the lower end of the nozzle to the end of a mounting pole

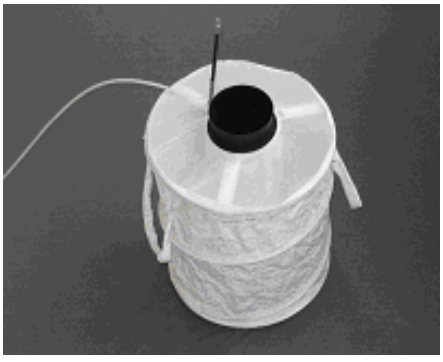


Fig.11: CO_2 nozzle ready to use

7 Maintenance

Nets

All nets must be kept clean! In case they have to be cleaned, wash them (by hand or machine) with unperfumed soap to avoid odour contamination!
Any dirt or dust can clogg the pores of the nets and hinder the air flow.

If the catch bag is damaged or torn it should be replaced, as the mosquitoes are able to escape. Extra catch bags, replacement sets and other accessories can be purchased from your supplier.

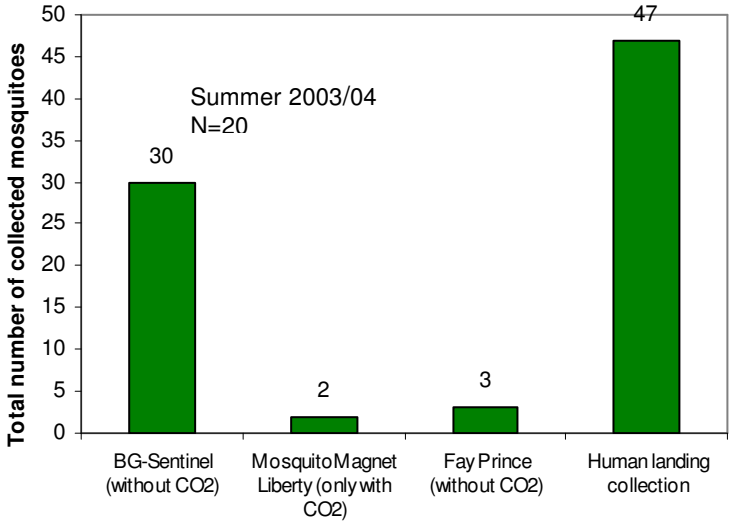
8 What the BG-Sentinel can do

Independent scientific studies demonstrate that the BG-Sentinel is the most effective trap for the Yellow fever mosquito *Aedes aegypti* and the Tiger mosquito *Aedes albopictus*, even without the addition of CO_2.

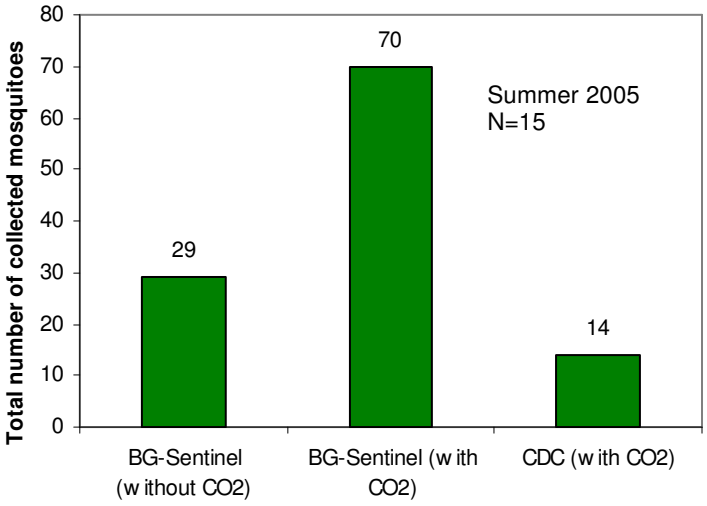
No CO_2 is necessary when the BG-Sentinel is used to catch *Aedes aegypti, Aedes polynesiensis Aedes albopictus, Culex* species such as *Culex quinquefasciatus* and *Culex pipiens* and other insects such as housefly, stablefly and fruitfly.

However, for these mosquito species catch results improve when CO_2 is added. With the addition of CO_2, also other mosquito species (e.g. *Ochlerotatus, Aedes vexans, Aedes cinereus, Anopheles, Coquillettidia*) and other blood seeking insects as for example black flies (*Simuliidae*) or no-see-ums (*Ceratopogonidae*) can be captured.

Aedes aegypti (Belo Horizonte, Brazil)



Aedes albopictus (Gainesville, Floride, USA)



The BG-Sentinel

- is very light (1,2 kg)
- can easily be folded together to a height of 10 cm which makes it very easy to transport and carry around. Even when it is unfolded to its usability size of 40cm height it is still handy and light for carrying.
- can easily be assembled – no tools are needed and it takes no more than five minutes. It is then very easy to use.

9 What the BG-Sentinel cannot do

The BG-Sentinel

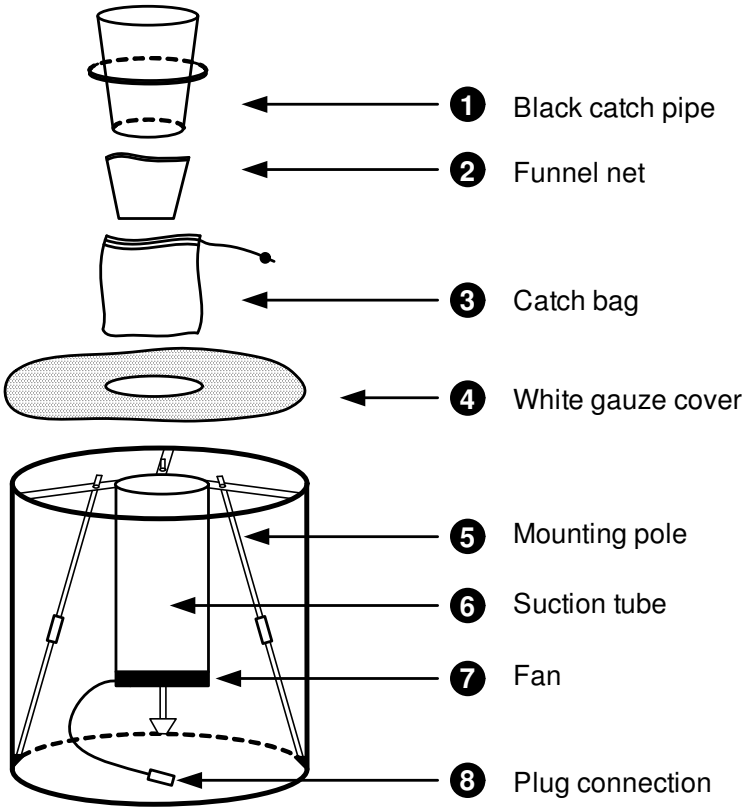
- is not able to reduce populations of millions of mosquitoes – a situation that can occur after floods (no trap can do this).
- is also not able to eliminate your mosquito problem over night – in the best case it should be left running for 24 hours a day and 7 days a week for as much time as possible. Consequently, the BG-Sentinel should be kept running even if the mosquito population decreased to ensure that newly hatched (e.g. after heavy rainfall) or migrating mosquitoes can still be captured.
- cannot capture mosquitoes if insecticides were sprayed in or around the trap.

Note: If your trap does not catch mosquitoes sufficiently, you might have a problem with mosquito species that are attracted by CO_2 and therefore you should try running the trap with CO_2.

10 Troubleshooting

Problem	Possible reason	Solution
No mosquitoes in the catch bag	Fan not running	Check the power supply
	Wrong placement of trap	Place the trap according to the advice above
	Your target mosquito needs CO_2 as an attractant	Add CO_2 to the trap according to the advice above
Fan not running	Power supply out of order	Recharge battery if you are using one
	Plug connections loose	Check that the single cables are tightened into the plug connections
Trap topples over	Toppled over by strong wind for example	Attach strings to the handles and fasten them to the ground using tent pegs

11 Parts list



12 Safety Precautions

General

- Children or persons unfamiliar with these instructions must not operate the equipment.
- The operator or user is responsible for accidents or hazards occurring to other people or to their property.
- Thoroughly inspect the area where the equipment is to be used and remove all potential hazards
- When the trap is not in operation it should be stored in a safe dry environment

Electrical

- When using a mains adapter always plug into a mains source that is in a safe dry place (preferably indoors)
- Switch off and remove the mains adapter from the mains before all operations except insect removal
- When using the car battery adapters always ensure these are connected correctly bearing in mind any instructions form the car / car battery manufacturers.
- Regularly inspect the electrical cables for signs of damage and only use if in perfect condition. If damaged the cable must be replaced.

Attractants

All use of attractants should be carried out according to the manufacture's recommendations for use and safety guidelines.

Carbon Dioxide

Many different sources of carbon dioxide are available. These have different hazards and safety precautions associated with them. Always follow the manufacturer / supplier guidelines for the source you have chosen.

If any further problems occur or you have any further questions please contact us at

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